Daily Activities

January 13, 2010: Day 1, Phase 1

Location: SW Tanks from parking lot
Follow up: nothing needed on this day
Additional info: flaring of West Property or Coker Flare observed by David Eppler of EPA, especially during the afternoon

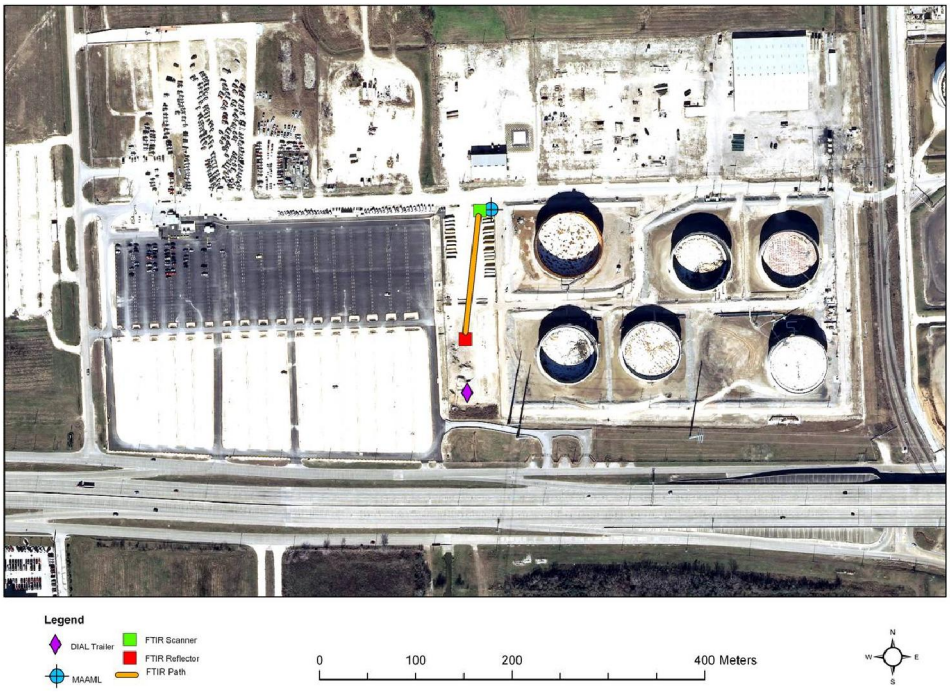

Figure 1.2. Equipment locations on Day 1, Phase 1: Southwest Tanks from parking lot.

January 14, 2010: Day 2, Phase 1

Location: West Tanks
Follow up: cutter stock, estimated vapor pressure, how it was used and the role of a frac tank located nearby.
Additional info: Tank A318 maintenance, cutter stock being used to clean out a tank that contained slop oil. Flaring of West Property or Coker Flare observed by David Eppler of EPA, especially during the afternoon.

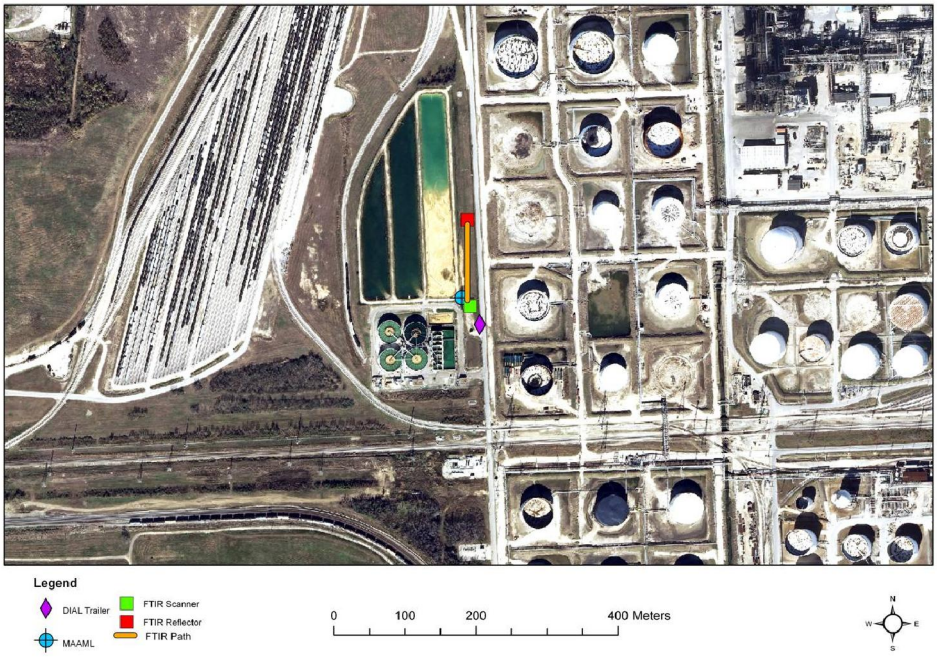

Figure 1.2. Equipment locations on Day 2, Phase 1: West Tanks.

January 15, 2010: Day 3, Phase 1

Location: SW Tanks
Follow up: nothing needed on this day

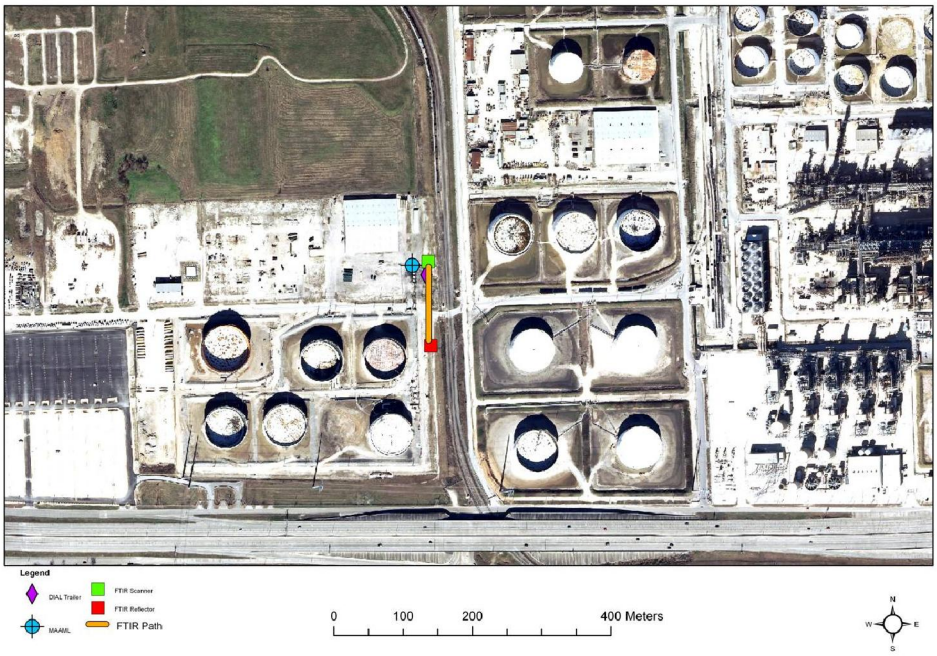

Figure 1.3. Equipment locations on Day 3, Phase 1: Southwest Tanks.

January 16, 2010: Day 4, Phase 1

Location: SW of coker area
Follow up: need coker process data for this day. Ask about flare data for flares near Coker (West Property and Coker Flare) that coincides with the NPL measurements
Additional info: NPL noted emissions that may have been coming from a flare

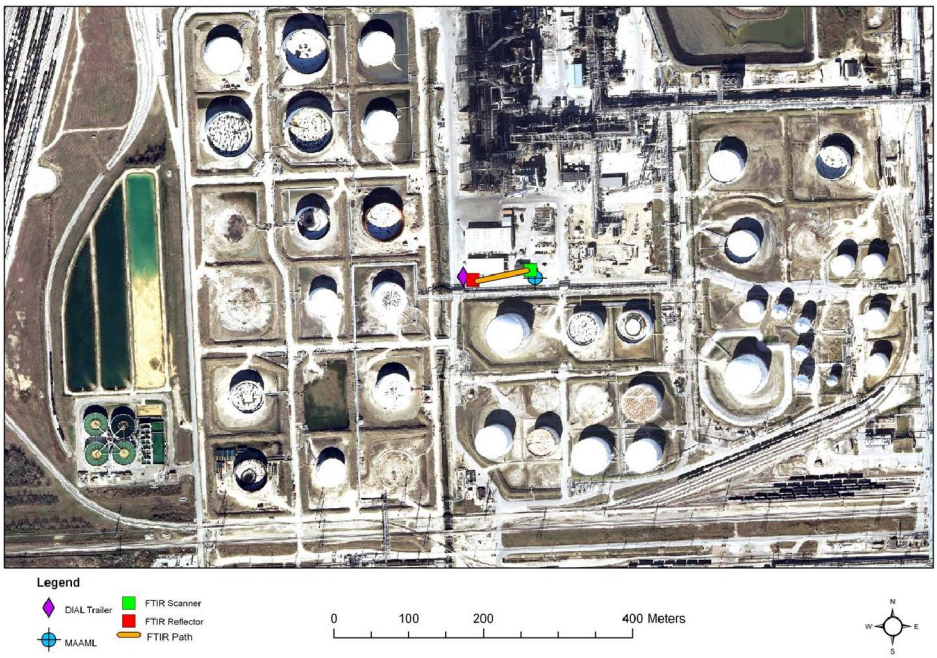

Figure 1.4. Equipment locations on Day 4, Phase 1: Southeast of coker area.

January 18, 2010: Day 5, Phase 1

Location: NW of Olefins
Follow up: nothing needed on this day

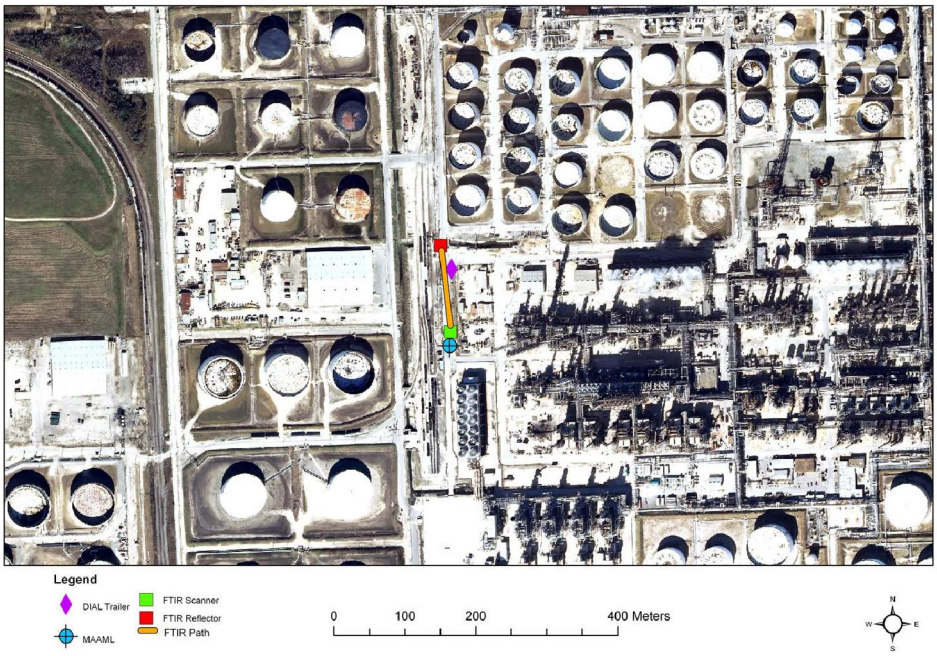

Figure 1.5. Equipment locations on Day 5, Phase 1: Northwest of Olefins.

January 19, 2010: Day 6, Phase 1

Location: NW of Olefins
Follow up: nothing needed on this day

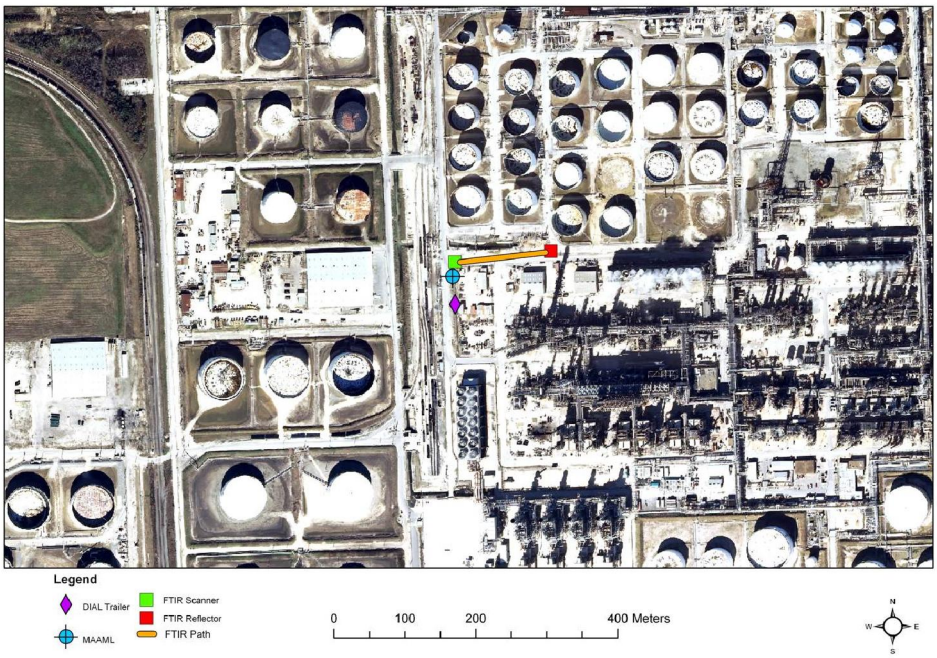

Figure 1.6. Equipment locations on Day 6, Phase 1: Northwest of Olefins.

January 20, 2010: Day 7, Phase 1

Location: NE of Olefins
Follow up: nothing needed on this day

Figure 1.7. Equipment locations on Day 7, Phase 1: Northeast of Olefins.

January 21, 2010: Day 8, Phase 1

Location: Refinery East, NE of BEU/ACU
Follow up: nothing needed on this day

Figure 1.8. Equipment locations on Day 8, Phase 1: Refinery East, Northeast of BEU/ACU.

January 22, 2010: Day 9, Phase 1

Location: Refinery East Tanks area
Follow up: nothing needed on this day

Figure 1.9. Equipment locations on Day 9, Phase 1: Refinery East Tanks area.

January 23, 2010: Day 10, Phase 1

Location: Refinery East North of SRU
Follow up: would be interesting to evaluate FTIR toluene correlations for this day. Will we be able to identify an alkane source based on the NPL data?
Additional info: Elevated toluene levels detected by MAAML and FTIR. Elevated VOC levels detected by DIAL. We requested process information from Shell about possible source and upwind tanks. Shell indicates upwind tanks did not contain significant amounts of toluene. Previous day (1/22) we were upwind from this location, beyond suspected tank sources and nothing significant was measured. MAAML Toluene was well correlated with propane (R^2=0.64), n-butane (R^2=0.90), n-pentane (R^2=0.93), 2-methylpentane (R^2=0.90), benzene (R^2=0.92), ethylbenzene (R^2=0.99), m/p-xylene (R^2=0.82), o-xylene (R^2=0.86), cumene (R^2=0.99) and 1,2,4-trimethylbenzene (R^2=0.78).

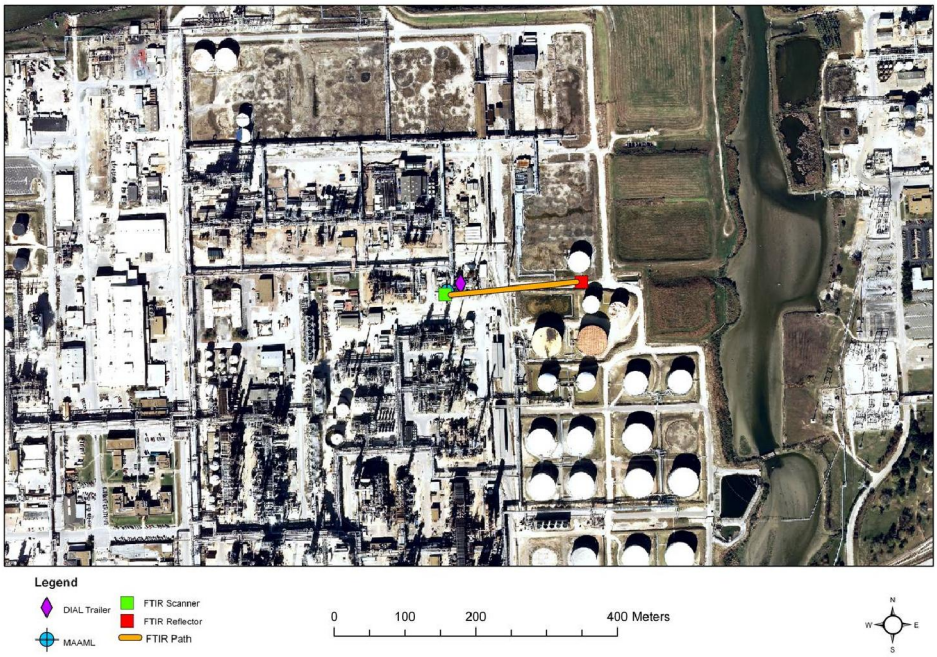

Figure 1.10. Equipment locations on Day 10, Phase 1: Refinery East North of SRU.

January 25, 2010: Day 11, Phase 1

North wastewater area (parking lot next to Tank J320), DIAL detected aeration basin alkane emissions that warrant follow up. We need relevant wastewater process data for this date.

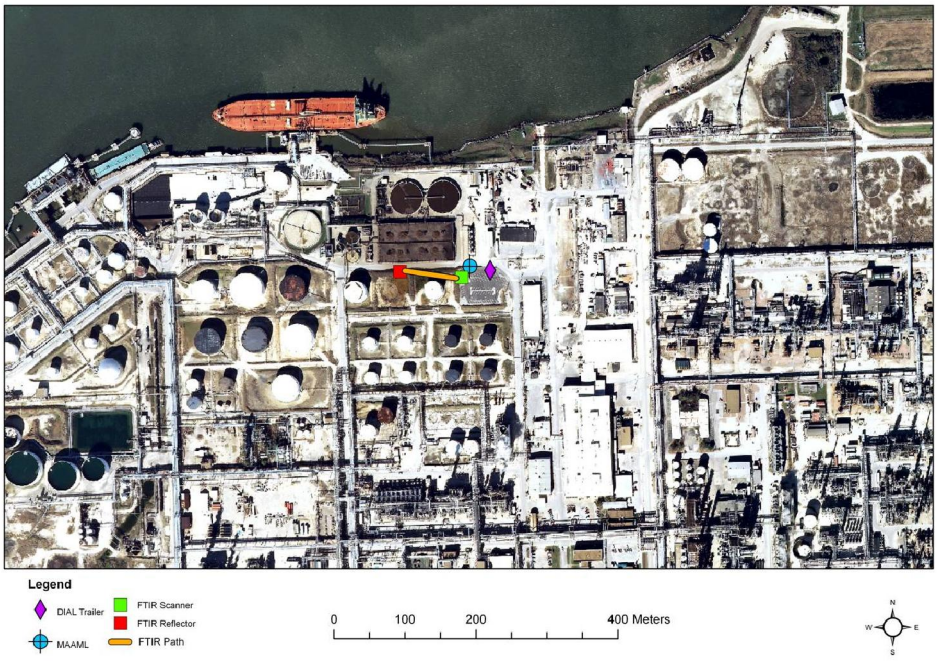

Figure 1.11. Equipment locations on Day 11, Phase 1: North wastewater area (parking lot next to Tank J320).

January 26, 2010: Day 12, Phase 1

East of ACU/BEU: Nothing needed for follow-up on this day

Figure 1.12. Equipment locations on Day 12, Phase 1: East of ACU/BEU.

January 27, 2010: Day 13, Phase 1

Location: NW of coker area
Follow up: need coker process data for this date

Figure 1.13. Equipment locations on Day 13, Phase 1: Northwest of coker area.

January 28, 2010: Day 14, Phase 1

Location: Refinery East, NE of SRU
Follow up: follow-up for toluene/VOC measured on 1/23
Additional info: MAAML measured similar wind directions with significant but much lower toluene levels. MAAML toluene data from this date were well correlated with the same species noted as well correlated with MAAML toluene on 1/23.

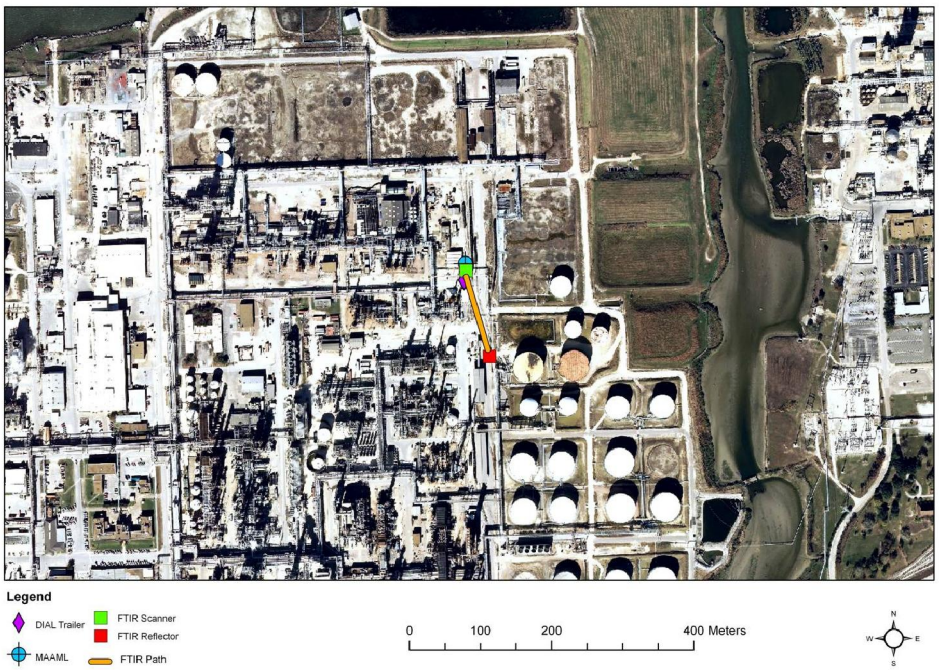

Figure 1.14. Equipment locations on Day 14, Phase 1: Refinery East, Northeast of SRU.

January 29, 2010: Day 15, Phase 1

Location: NE of Olefins
Follow up: nothing needed on this day

Figure 1.15. Equipment locations on Day 15, Phase 1: Northeast of Olefins.

January 30, 2010: Day 16, Phase 1

Location: North wastewater area (parking lot next to Tank J320)
Follow up: need relevant wastewater process data for this date
Additional info: DIAL detected EWT-10 (DAF) alkane emissions that warrant follow up.
Scott Sales collected a canister sample.

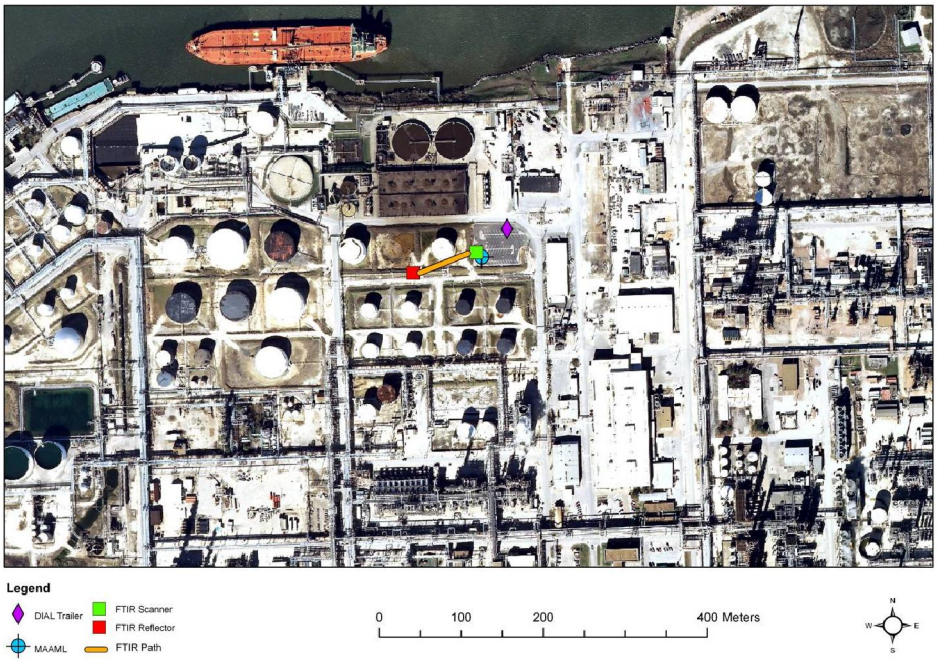

Figure 1.16. Equipment locations on Day 16, Phase 1: North wastewater area (parking lot next to Tank J320).

February 1, 2010: Day 17, Phase 1

Location: SE wastewater area (near HIPA Flare)
Follow up: nothing needed on this day

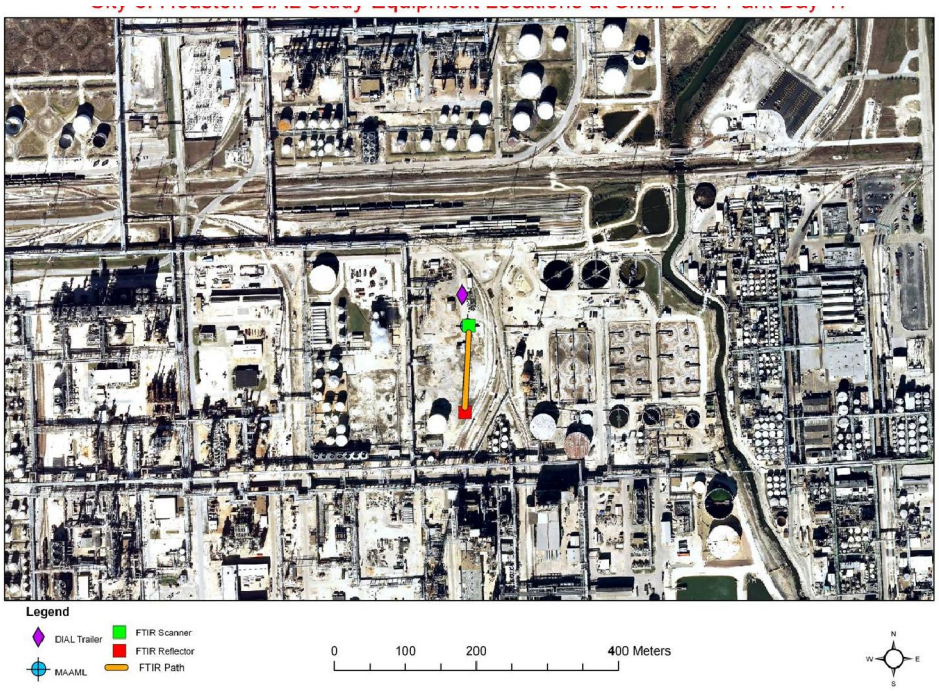

Figure 1.17. Equipment locations on Day 17, Phase 1: Southeast wastewater area (near HIPA Flare).

February 2, 2010: Day 18, Phase 1

Location: Refinery East, East Property Flare measurements
Follow up: need flare process data for this date

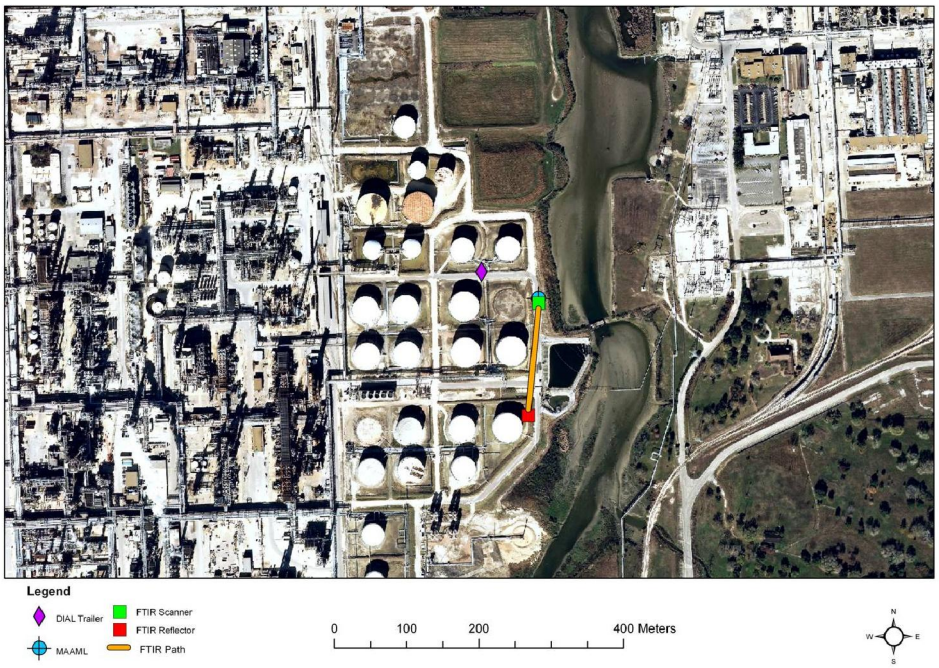

Figure 1.18. Equipment locations on Day 18, Phase 1: Refinery East, East Property Flare.

February 3, 2010: Day 19, Phase 1

Location: NE of Olefins
Additional info: Slightly elevated 1,2-Dichloroethane data by MAAML, interesting correlations, may be from cooling tower. FTIR data may be interesting in terms of what was seen in the MAAML correlations.

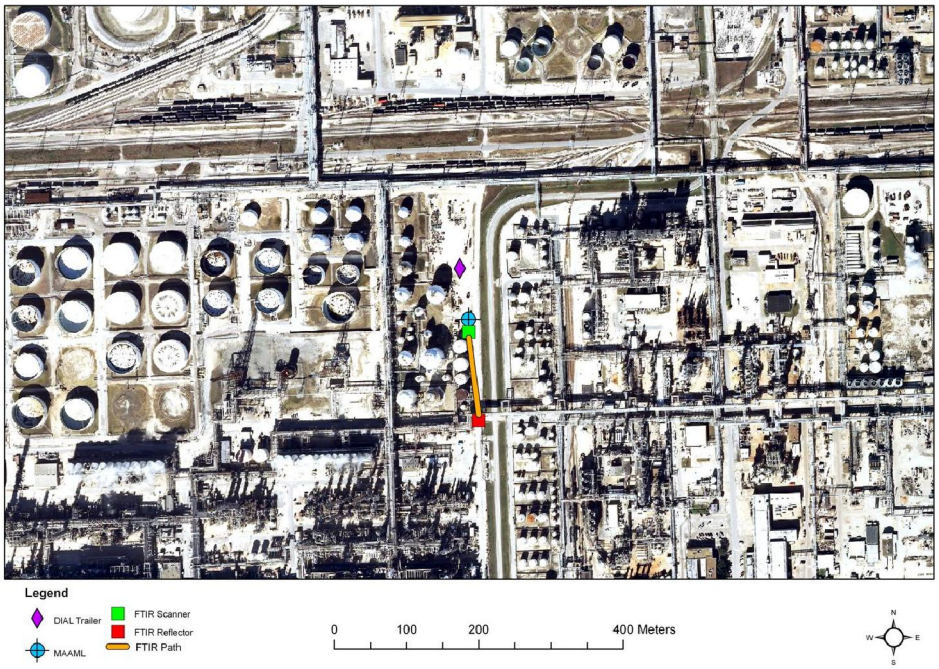

Figure 1.19. Equipment locations on Day 19, Phase 1: Northeast of Olefins.

February 4, 2010: Day 20, Phase 1

Location: SW of coker area
Follow up: need coker process data for this date

Figure 1.20. Equipment locations on Day 20, Phase 1: Southwest of coker area.

February 5, 2010: Day 21, Phase 1

Location: North wastewater area (parking lot next to Tank J320)
Additional info: Cary Secrest collected a canister sample.

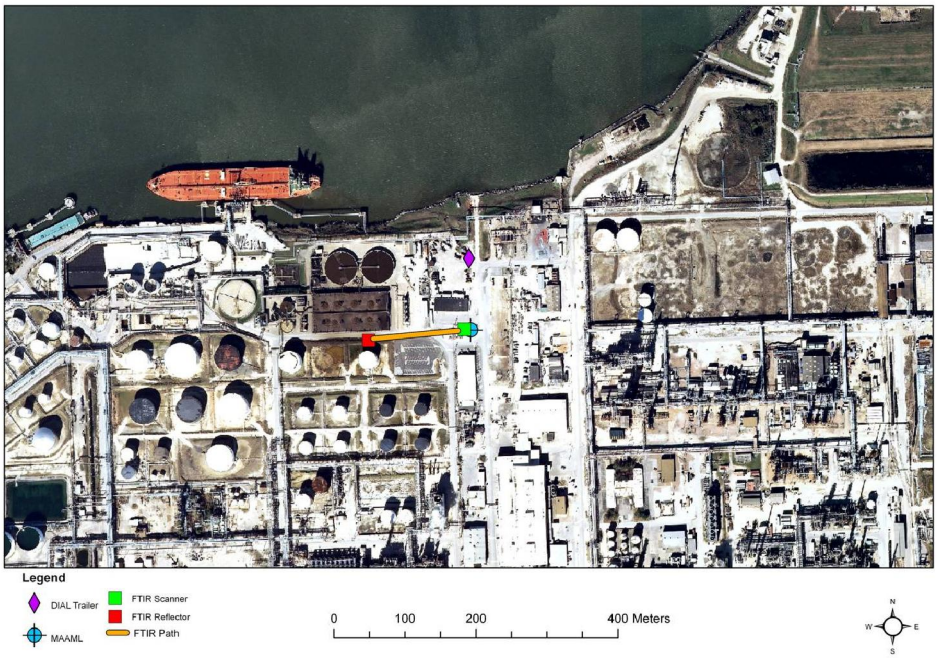

Figure 1.21. Equipment locations on Day 21, Phase 1: North wastewater area (parking lot next to Tank J320).

February 8, 2010: Day 22, Phase 1

Location: Tank AP 19 in the morning and Tank TOL 913 in the afternoon
Follow up: need tank data for both AP 19 and TOL 913 on this date
Additional info: DIAL measured benzene from both tanks. DOAS also measured high benzene from TOL 913.

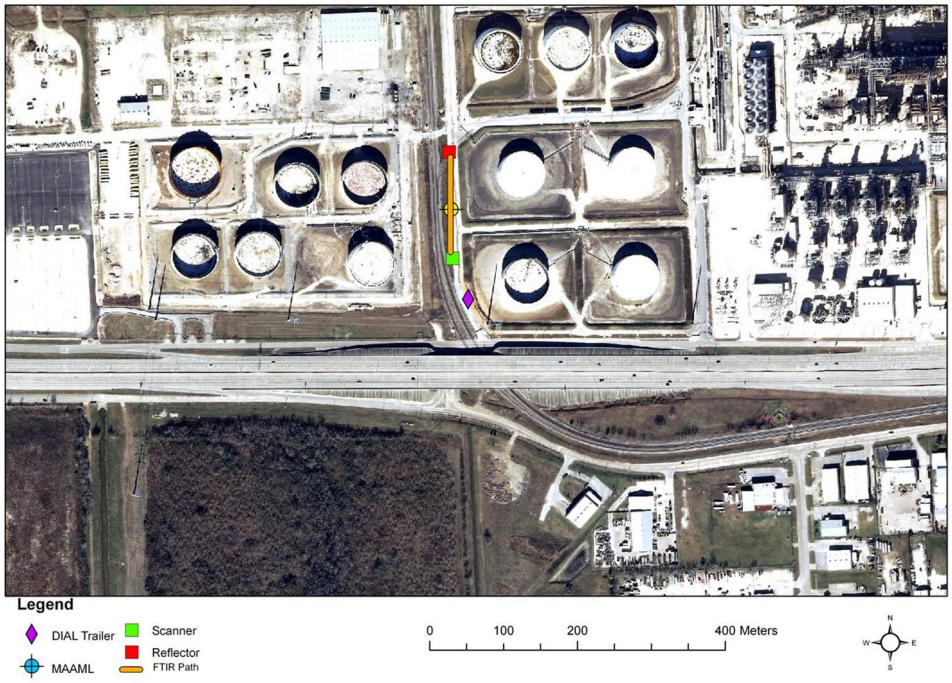

Figure 1.22A. Equipment locations in the morning of Day 22, Phase 1: Tank AP 19.

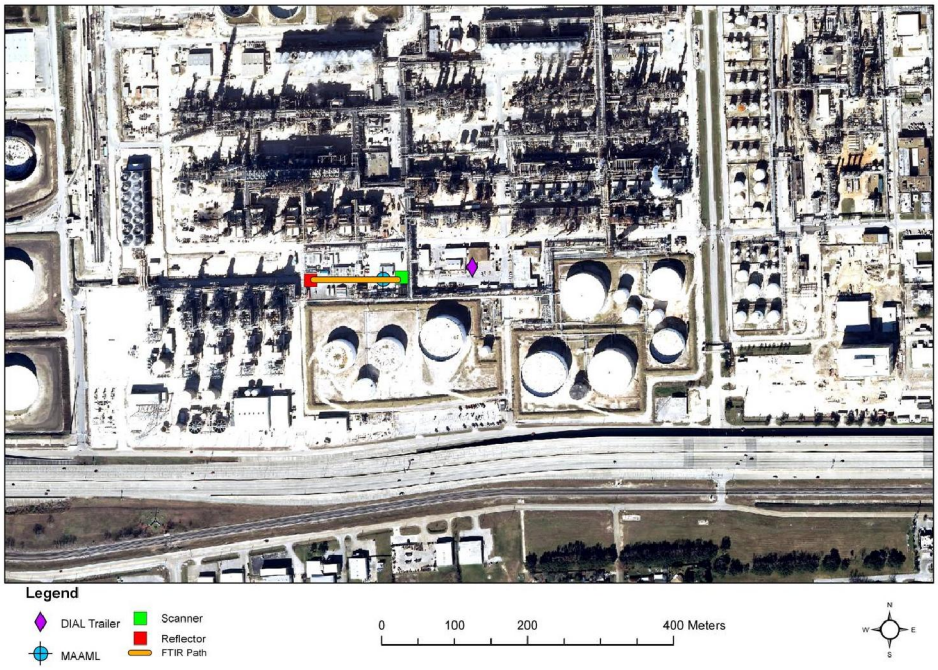

Figure 1.22B. Equipment locations in the afternoon of Day 22, Phase 1: Tank TOL 913.

February 9, 2010: Day 23, Phase 1

Location: North wastewater area (parking lot next to Tank J320)
Follow up: need relevant wastewater process data for this date. Also need information from Shell about the possible ship venting event.
Additional info: DIAL, MAAML, FTIR and DOAS detected event at 3:15 pm, possibly associated with crude ship delivery "venting event". DOAS and DIAL also detected benzene emissions from the aeration basin and/or EWT-10 (DAF).

Figure 1.23. Equipment locations on Day 23, Phase 1: North waste water area (parking lot next to Tank J320).

February 10, 2010: Day 24, Phase 1

Location: Tank TOL 913
Follow up: need tank data for TOL 913 on this date
Additional info: DIAL, MAAML and DOAS measured benzene from Tank TOL 913. Cary Secrest collected a canister sample.

Figure 1.24. Equipment locations on Day 24, Phase 1: Tank TOL 913.

February 11, 2010: Phase 1, Day 25
Location: SW of coker area
Follow up: need coker process data for this date
Additional info: DIAL detected benzene, likely from the coker

February 12, 2010: Phase 1, Day 26
Location: East of ACU/BEU
Follow up: process data follow-up warranted
Additional info: DIAL and MAAML detected elevated benzene, likely from the BEU/ACU

February 13, 2010: Phase 1, Day 27
Location: North wastewater area (parking lot next to Tank J320)
Follow up: nothing needed on this day

February 15, 2010: Phase 1, Day 28
Location: East of ACU/BEU
Follow up: process data follow-up for BEU/ACU and Tank 381 warranted
Additional info: DIAL, FTIR and MAAML detected elevated benzene, likely from the BEU/ACU and/or Tank 381

February 16, 2010: Phase 1, Day 29
LocationTanks north of J Street
Follow up: nothing needed on this day

February 17, 2010: Phase 1, Day 30
Location: SE of coker area
Follow up: need coker process data for this day

March 22, 2010: Phase 2, Day 1
NPL and Environ contractors deployed to Shell Deer Park on March 22, 2010 and conducted DIAL and Open-Path Fourier Transform Infrared (OP-FTIR) measurements downwind of the Aromatics Concentration Unit (ACU), Benzene Extraction Unit (BEU) and Tanks D-350, D-351 and D-352. DIAL measured in the ultraviolet (UV) mode for benzene emissions. NPL reported that significant benzene emissions were detected downwind of Tanks D-350, D-351 and D-352, which contain benzene concentrate. A process data request was submitted to Shell for information related to Tanks D-350, D-351 and D-352. A photo-ionization detector (PID) and FLIR infrared (IR) camera survey was conducted upwind and downwind from Tanks D-350, D-351 and D-352 by Isaac Desouza and Francis Agostini of BAQC. The PID survey indicated that volatile organic compounds (VOC) concentrations were significantly higher downwind from Tanks D-350, D-351 and D-352, as opposed to upwind. The FLIR IR camera did not identify the specific location where emissions were coming from.

Deleted: All contractor work costs on March 22, 2010 will be invoiced for under the United States Environmental Protection Agency Cooperative Agreement (EPA Grant).¶

March 23, 2010: Phase 2, Day 2
NPL and Environ contractors deployed to Shell Deer Park on March 23, 2010 and conducted DIAL and OP-FTIR measurements downwind of Tank TOL 913. DIAL measured in the UV mode for benzene emissions. NPL reported that significant benzene emissions were detected downwind of Tank TOL 913, which contains pyrolysis gasoline (pygas). A process data request was submitted to Shell for information related to Tank TOL-913. Isaac Desouza and Francis Agostini of BAQC conducted a PID and FLIR IR camera survey and collected an air canister sample for TO-15 analysis, downwind from Tank TOL 913. The PID survey indicated that VOC concentrations were significantly elevated downwind from Tank TOL 913 and no other sources were identified upwind of Tank TOL 913. The FLIR IR camera did not identify the specific location where emissions were coming from.

Deleted: All contractor work costs on March 23, 2010 will be invoiced for under the United States Environmental Protection Agency Cooperative Agreement (EPA Grant).¶

March 24, 2010: Phase 2, Day 3

MAAML Chemist Youjun Qin prepared the MAAML on March 24, 2010 for deployment on March 25, 2010 by conducting calibration and blank standard analyses. NPL conducted changeover activity on March 24, 2010 whereby the DIAL equipment was changed from UV mode to IR mode. DIAL measures alkane emissions as a surrogate for total VOC emissions in the IR mode. NPL contractor changeover costs will be invoiced for under the EPA Grant.

Deleted: Salary and fringe benefit costs for MAAML Chemists' preparation activity on March 24, 2010 will be invoiced for under the Agreement.

March 25, 2010: Phase 2, Day 4

NPL and Environ contractors deployed to Shell Deer Park on March 25, 2010 and conducted DIAL and OP-FTIR measurements downwind of the Catalytic Reformer 3 (CR3) Unit. DIAL measured in the IR mode for total VOC emissions. MAAML Chemist Youjun Qin deployed MAAML to Shell Deer Park downwind from the CR3 Unit for air concentration measurements of specific VOC. NPL reported detection of VOC emissions downwind of the CR3 Unit. A PID survey was conducted upwind and downwind of the CR3 Unit indicating potential upwind emissions from the Phenol-Acetone Unit. However, phenol and acetone are not compounds that DIAL can measure in the IR mode. An air canister sample was collected for TO-15 analysis by MAAML Chemist Youjun Qin downwind from the CR3 Unit on March 25, 2010.

Deleted: Salary and fringe benefit costs for MAAML Chemists and all costs associated with contractor work activity on March 25, 2010 will be invoiced for under the Agreement.¶

March 26, 2010: Phase 2, Day 5

NPL and Environ contractors deployed to Shell Deer Park on March 26, 2010 and conducted DIAL and OP-FTIR measurements downwind of the ACU/BEU area and Tanks D-350, D-351 and D-352. DIAL measured in the IR mode for total VOC emissions. MAAML Chemist Peter Chen deployed MAAML to Shell Deer Park downwind from the ACU/BEU area and Tanks D-350, D-351 and D-352 for air concentration measurements of specific VOC. NPL reported detection of VOC emissions downwind of the ACU/BEU and Tanks D-350, D-351 and D-352. A PID survey was conducted for the ACU/BEU area and Tanks D-350, D-351 and D-352 and an air canister sample was collected for TO-15 analysis by MAAML Chemist Peter Chen downwind from the ACU/BEU area and Tanks D-350, D-351 and D-352 on March 26, 2010.

Deleted: Salary and fringe benefit costs for MAAML Chemists and all costs associated with contractor work activity on March 26, 2010 will be invoiced for under the Agreement.¶

March 27, 2010: Phase 2, Day 6

NPL and Environ contractors deployed to Shell Deer Park on March 27, 2010 and conducted DIAL and OP-FTIR measurements downwind of the Gas Oil Hydrotreater (GOHT) and Delayed Coker Units. DIAL measured in the IR mode for total VOC emissions. MAAML Chemist Peter Chen deployed MAAML to Shell Deer Park downwind from the GOHT and Delayed Coker Units for air concentration measurements of specific VOC. NPL reported detection of VOC emissions downwind of the GOHT and Delayed Coker Units. A PID survey was conducted for the GOHT and Delayed Coker Units on March 27, 2010 by MAAML Chemist Peter Chen. A process data request was submitted to Shell for information related to the Delayed Coker.

Deleted: Salary and fringe benefit costs for MAAML Chemists and all costs associated with contractor work activity on March 27, 2010 will be invoiced for under the Agreement.¶

March 28, 2010: Phase 2, Day 7

MAAML Chemist Peter Chen prepared the MAAML on March 28, 2010 for deployment on March 29, 2010 by conducting calibration and blank standard analyses.

Deleted: Salary and fringe benefit costs for MAAML Chemists' preparation activity on March 28, 2010 will be invoiced for under the Agreement.¶

March 29, 2010: Phase 2, Day 8

NPL and Environ contractors deployed to Shell Deer Park on March 29, 2010 for DIAL and OP-FTIR measurements downwind of the ACU/BEU area. NPL's DIAL equipment had mechanical problems and was unable to measure emissions on March 29, 2010. OP-

FTIR measurements were conducted downwind of the ACU/BEU area. MAAML Chemist Peter Chen deployed MAAML to Shell Deer Park downwind from the ACU/BEU area for air concentration measurements of specific VOC. MAAML and OP-FTIR detected elevated benzene levels downwind from the ACU/BEU area. A PID and FLIR IR camera survey was conducted for the ACU/BEU area on March 29, 2010 by MAAML Chemist Peter Chen. The FLIR IR camera did not identify the specific location where emissions were coming from. A process data request was submitted to Shell for information related to the ACU/BEU area. NPL was able to perform a calibration cell audit on March 29, 2010 and the costs associated with that work will be invoiced for under the EPA Grant.

Deleted: Salary and fringe benefit costs for MAAML Chemists and costs associated with OP-FTIR contractor work activity on March 29, 2010 will be invoiced for under the Agreement.